

AePW-3 Telecon

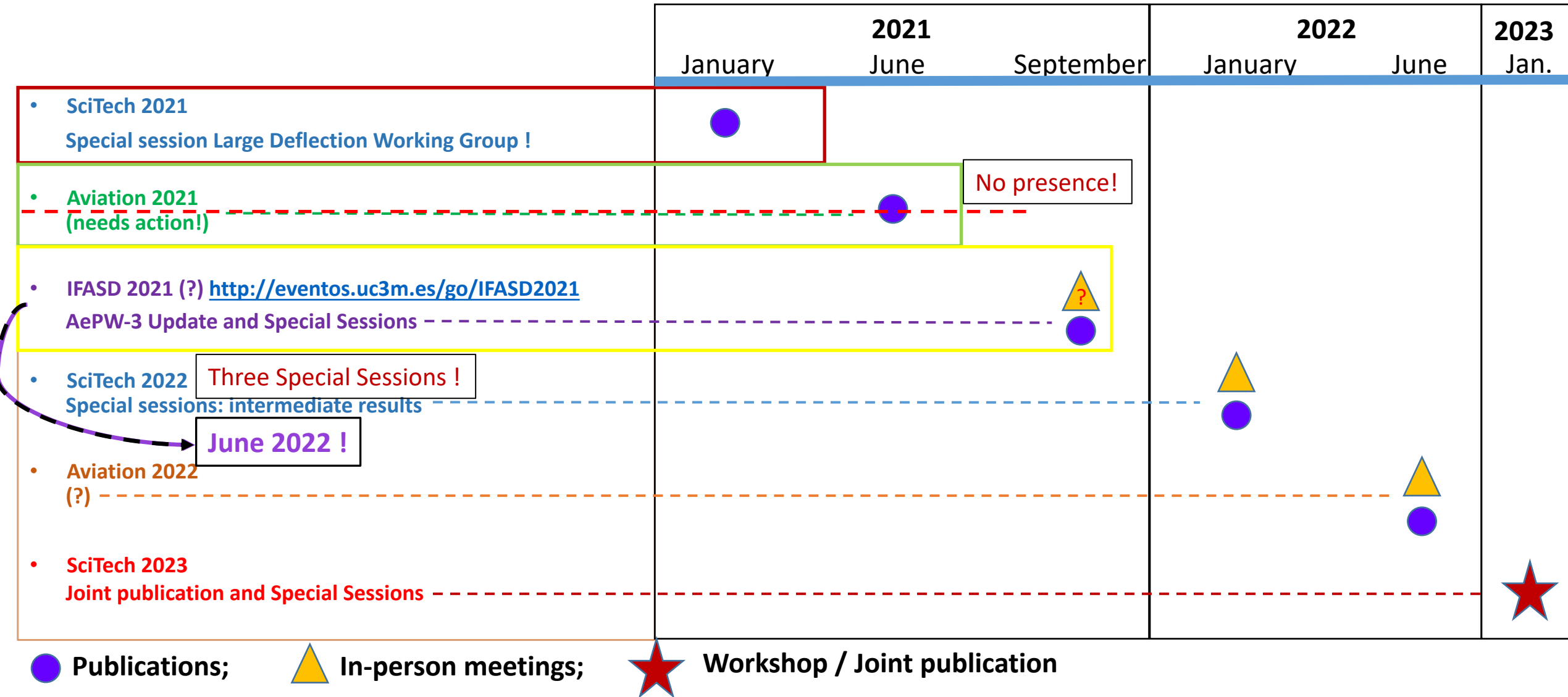
March 4, 2021

(<https://nescacademy.nasa.gov/workshops/AePW3/public>)

Agenda: March 4, 2021

- AePW-3 Schedule: SciTech 2021, Aviation 2021, IFASD 2021, SciTech 2022
- AePW-3 group telecons are held on first Thursday each month
- Large Deflection Working Group, Markus Ritter
 - Telecons are held on second Thursday each month.
- Flight Test Working Group, Jeff Ouellette
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- High Speed Working Group, Eric Blades
- Next AePW-3 Telecon: April 1, 2021

Toward the next Aeroelastic Prediction Workshop (AePW-3): Requesting Conference-Associated Support



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- CFD2030 Liaison, <http://cfd2030.com>
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Advancing High Lift Aerodynamic Prediction

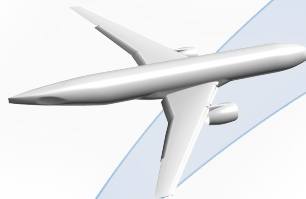
Series of Technical Challenges

Focus on key technical obstacles for specific time periods to make progress towards solving the grand challenge

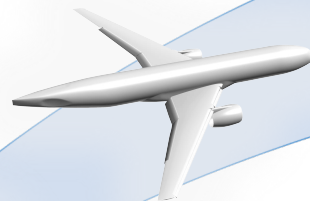
Ground-Based Experimental Testing

FLOW PHYSICS PREDICTION

Sub-Challenge #1 1-3 years



Sub-Challenge #2 3-6 years



Representative WT Geometry

S&C (tail/control surfaces/trim)
Cross-flow effects
Engine propulsion effects
Ice effects

CFD-generated data compared to WT data

Representative WT Geometry

Landing/TO configuration + nacelle/pylon
Re effects (atmospheric, pressurized, cryogenic environments)
Interactional flow physics (separation, vortex flow)
Static aeroelastics

CFD-generated data compared to WT data

Sub-Challenge #3 6-10+ years

LOW-SPEED WIND-UP TURN



Generic Flight Vehicle

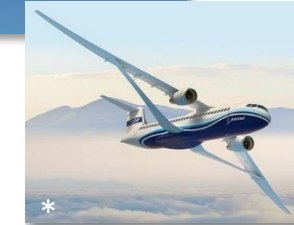
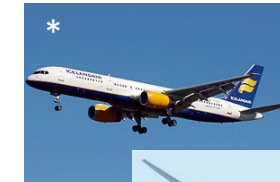
Sub- or full-scale flight geometry
Flight Re
Quasi-steady flight
Basic maneuver
Dynamic structural response

CFD-generated data at specific points in the maneuver trajectory compared directly with flight-derived data

* Potential flight test vehicle configuration

Grand Challenge 15+ years

LOW-SPEED WIND-UP TURN



Generic Flight Vehicle

Full scale flight geometry
Flight Re
Dynamic, maneuvering flight
Dynamic structural/system response
Environmental effects
Engine power effects

Data from numerical simulation of the dynamic maneuver fed into CFD-based flight simulation, then proof-of-match between flight simulation and flight experience



Challenge Configurations

Technology Demonstrations

Technology Milestones

HPC

Geometry and
Grid Generation

Physical Modeling

System-Level Integration /
Multidisciplinary Analysis

Algorithms

Uncertainty Quantification

Decision Gate

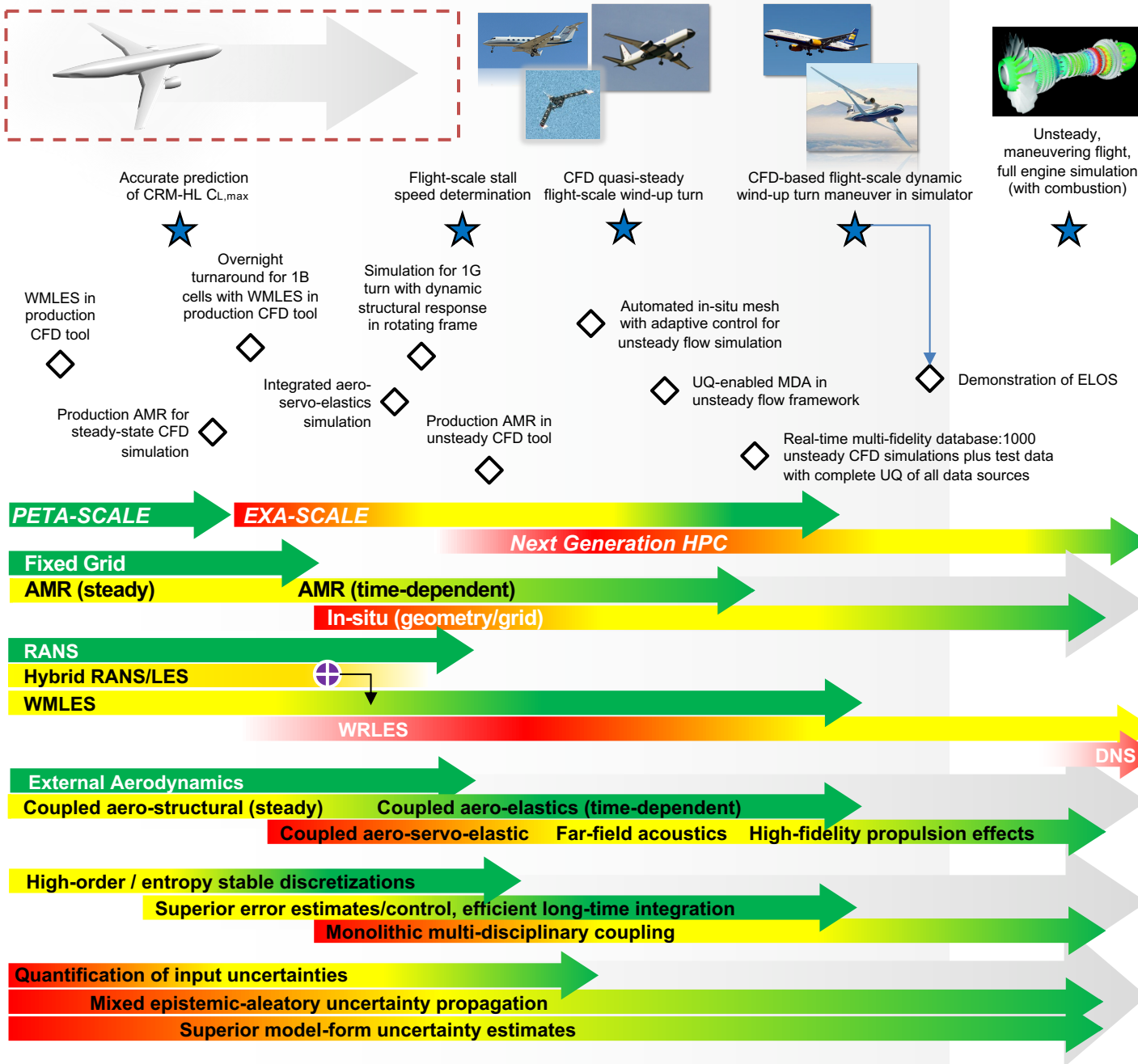
2020

2025

2030

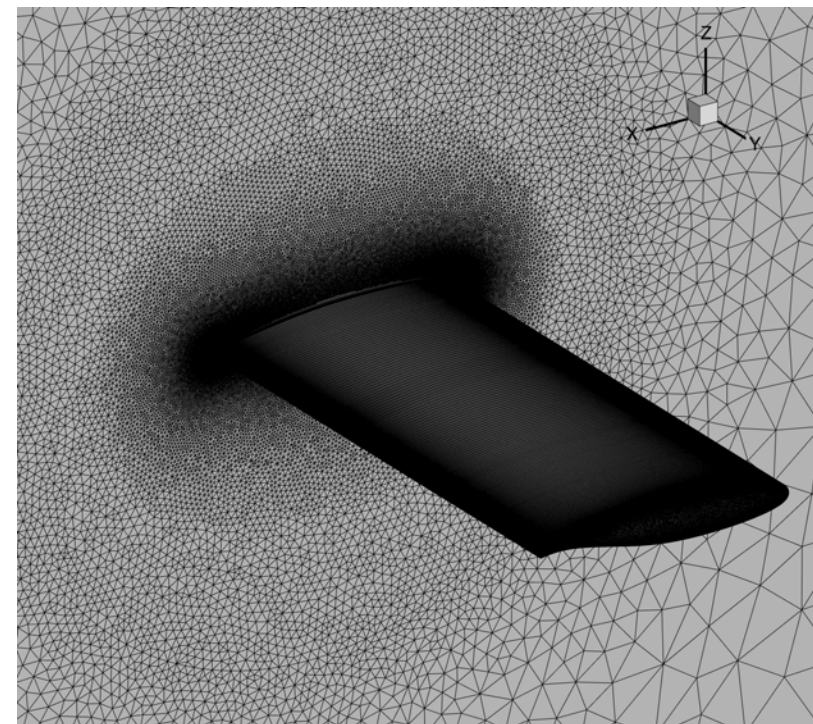
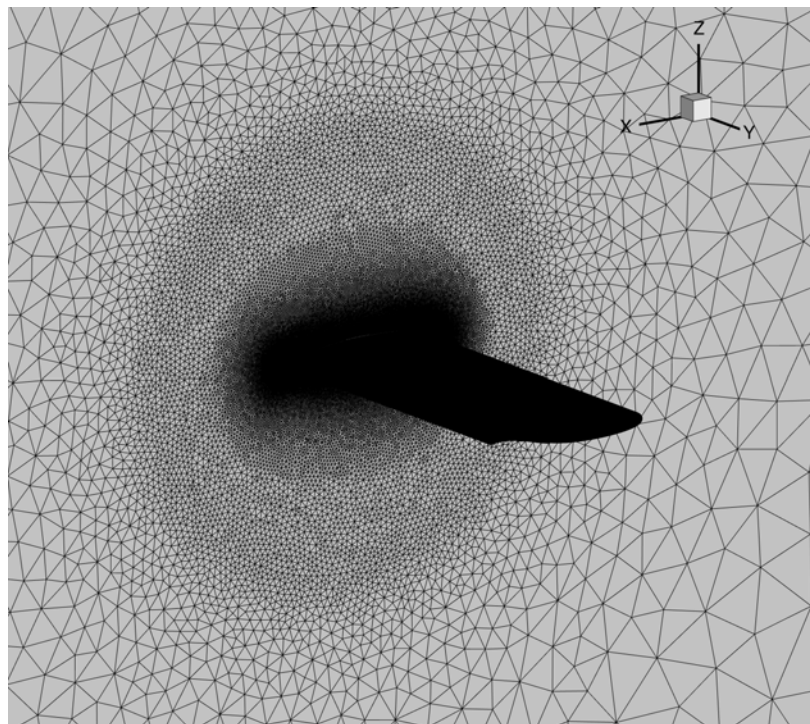
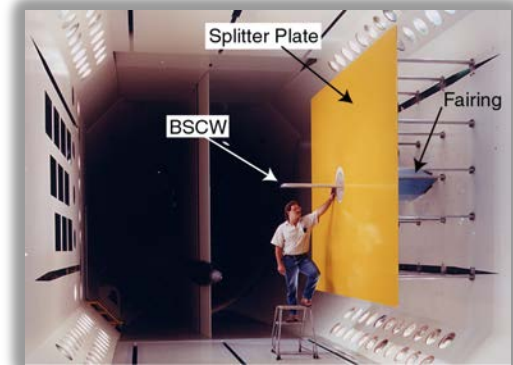
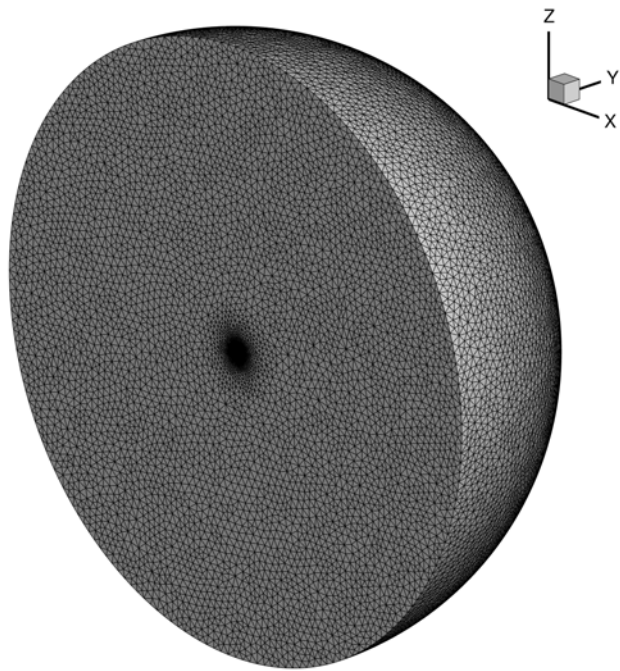
2035

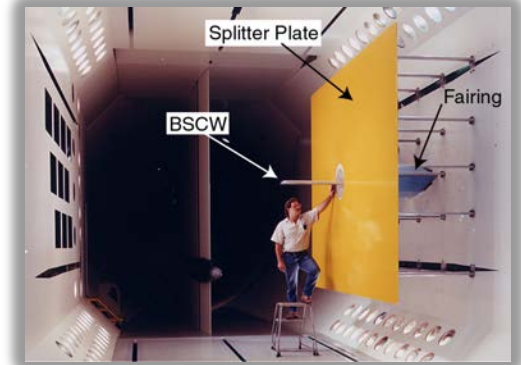
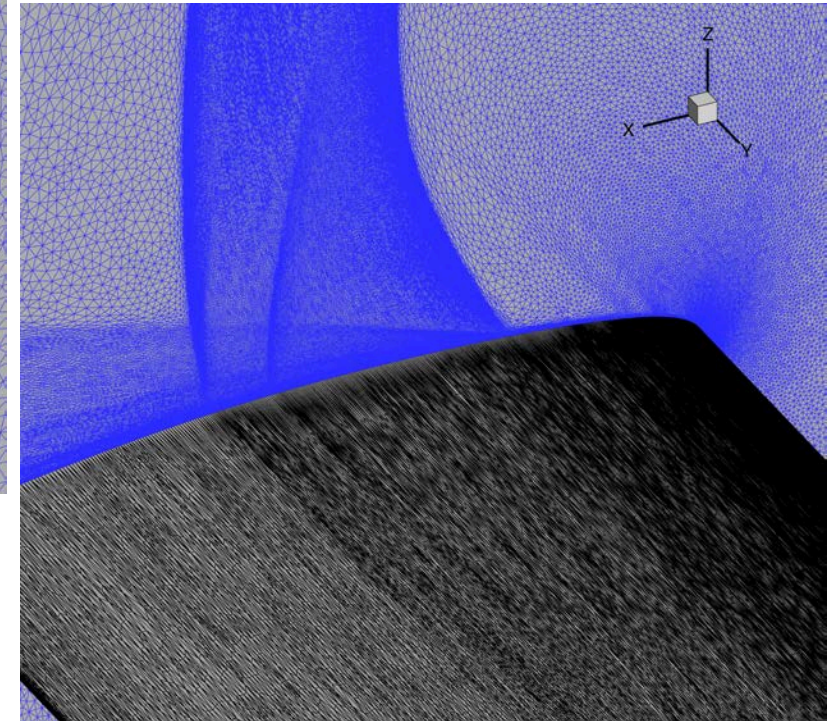
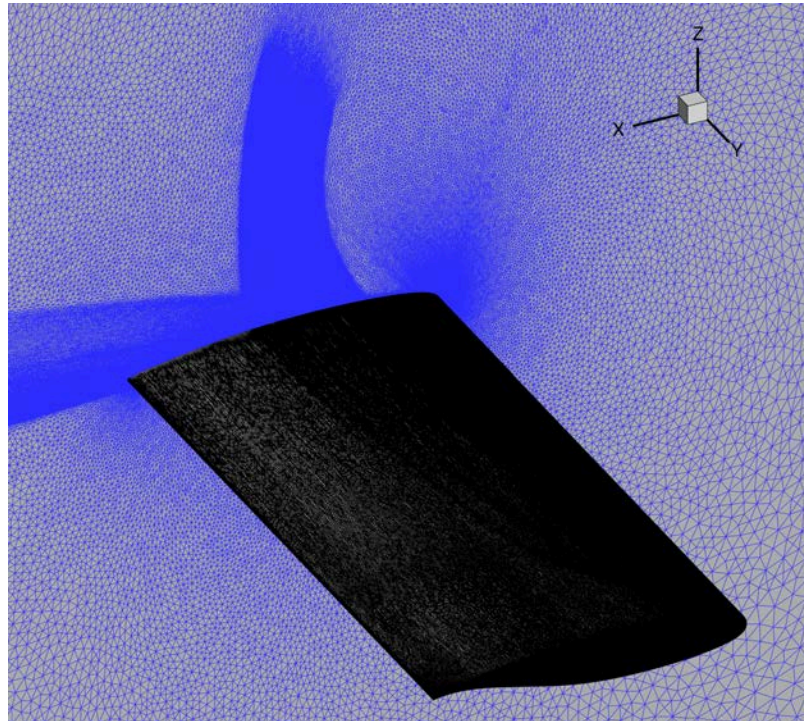
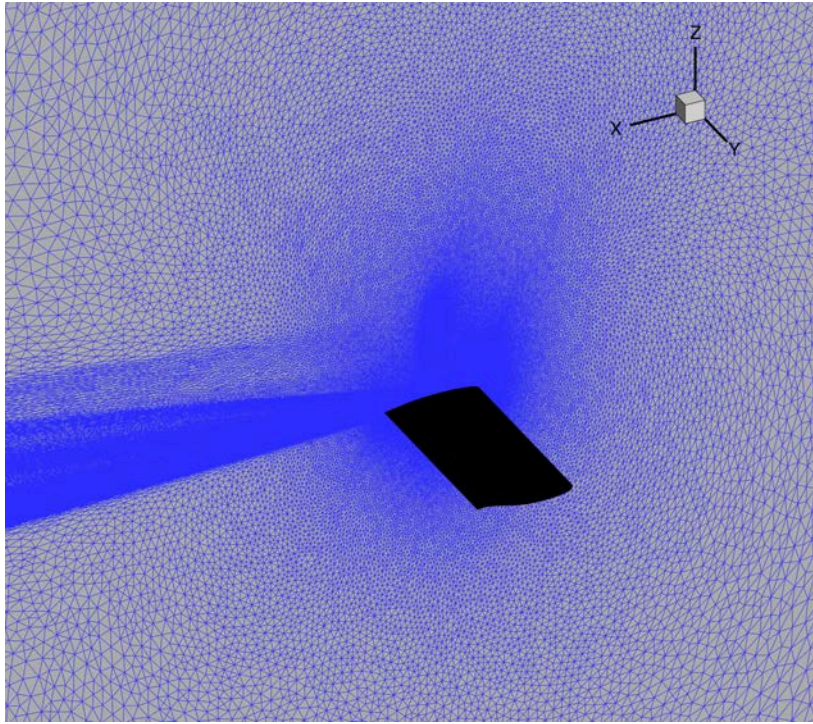
2040



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